AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A load sensor assembly, comprising:

a substantially square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first axis defined by a first pair of diagonally opposed ones of said holes;

a second axis defined by a second pair of diagonally opposed ones of said holes;

a strain gauge secured to said plate.

2. (Original) The load sensor of claim 1 wherein said strain gauge comprises at least two uniaxial strain elements, each of said two uniaxial strain elements having an axis of sensitivity, and wherein said two uniaxial strain elements are oriented within said strain gauge such that their respective axes of sensitivity are perpendicular to one another.

3. (Original) The load sensor of claim 2 wherein said strain gauge is secured to said plate such that one of said axes of sensitivity is parallel to said first axis and the other of said axes of sensitivity is parallel to said second axis.

4. (Original) The load sensor of claim 3 wherein said strain gauge is mounted on said plate so as to be substantially centered thereon.

5. (Original) The load sensor of claim 4 wherein said strain gauge comprises four uniaxial strain elements in a square pattern on said strain gauge, a first pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said first axis and a second pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said second axis.

6. (Original) The assembly of claim 5 further comprising:

a plurality of standoffs mounted on said plate, said standoffs not lying on either said first or second axes;

a printed circuit board mounted on said standoffs and overlaying said strain gauge;

said printed circuit board containing traces defining a Wheatstone full bridge configuration including said four elements of said strain gauge, and lead-throughs for establishing electrical connection between said traces and a plurality of leads emanating from said strain gauge;

said leads extending from said strain gauge through said lead-throughs;

said plate having substantially straight sides; and,

a cover mounted on said plate to cover said standoffs, printed circuit board and strain gauge, said cover being oriented such that its corners lie along lines bisecting the straight sides of said plate.

7. (Original) The assembly of claim 3 further comprising a cover having a square cross section is mounted to said plate to overlie said strain gauge, and wherein said cover is mounted such that each of its sides is perpendicular to either said first or second axis.

8. (Original) The assembly of claim 6 wherein said cover has a square cross section and is mounted such that each of its sides is perpendicular to either said first or second axis.

9. (Canceled)

10. (Canceled)

11. (Original) A load sensor assembly, comprising:

a square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first uniaxial strain gauge secured to said plate along a first axis defined between a first pair of diagonally opposing ones of said holes;

a second uniaxial strain gauge secured to said plate along a second axis defined by a second pair of diagonally opposed ones of said holes.

12. (Original) The assembly of claim 11 further comprising:

a plurality of standoffs mounted on said plate, said standoffs not lying on either said first or second axes;

a printed circuit board mounted on said standoffs and directly overlaying said first and second strain gauges;

said printed circuit board containing traces defining a Wheatstone full bridge configuration including said first and second strain gauges, and lead-throughs for establishing electrical connection between said traces and a plurality of leads emanating from said first and second strain gauges;

said leads extending from said first and second strain gauges through said lead-throughs; and,

a cover mounted mounted on said plate to cover said standoffs, printed circuit board and strain gauges, said cover being oriented such that its corners lie along lines bisecting the straight sides of said plate.

13. (Original) The assembly of claim 11 further comprising a cover having a square cross section is mounted to said plate to overlie said strain gauge, and wherein said cover is mounted such that each of its sides is perpendicular to either said first or second axis.

14. (Original) The assembly of claim 12 wherein said cover has a square cross section and is mounted such that each of its sides is perpendicular to either said first or second axis.

15. (Canceled)

16. (Canceled)

17. (Original) The assembly as in claims 6 or 12 further comprising a digital potentiometer in parallel with said bridge configuration, at least one zero load calibration button and at least one full load calibration button, and control means responsive to said zero load calibration button to cause said potentiometer to adjust so as to balance said bridge.

18. (Withdrawn)

19. (Withdrawn)

20. (Canceled)

21. (Currently amended) ~~The load sensing apparatus of claim 20 wherein said Wheatstone bridge circuit comprises at least four strain sensing elements rigidly associated with a mounting plate,~~ A load sensing apparatus comprising:

at least four strain sensing elements rigidly associated with a mounting plate, and wherein a first pair of said elements are oriented on said mounting plate along a principal strain axis thereof, and a second pair of said elements are oriented on said mounting plate perpendicular to said principal strain axis;

a Wheatstone bridge circuit comprising said at least four strain sensing elements;

a digital potentiometer connected to said bridge circuit; and,

processing means for causing said digital potentiometer to adjust so as to balance said Wheatstone bridge.

22. (Original) The load sensing apparatus of claim 21 where said plate is square and said principal strain axis is defined as an axis extending between two opposed corners of said plate.

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23. (New) A method of detecting strain in a structure comprising mounting an assembly on said structure, said assembly comprising:

a substantially square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first axis defined by a first pair of diagonally opposed ones of said holes;

a second axis defined by a second pair of diagonally opposed ones of said holes;

a strain gauge secured to said plate;

said assembly being mounted on said structure by inserting fastening elements through said holes such that said first axis lies along a principal strain axis along which strain is to be measured.

24. (New) A method of detecting strain in a structure comprising mounting an assembly on said structure, said assembly comprising:

a substantially square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first axis defined by a first pair of diagonally opposed ones of said holes;

a second axis defined by a second pair of diagonally opposed ones of said holes;

a strain gauge secured to said plate, said strain gauge comprising four uniaxial strain elements in a square patter on said strain gauge, a first pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said first axis and a second pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said second axis;

said assembly being mounted by inserting fastening elements through said holes such that said first axis lies along a principal strain axis along which strain is to be measured.

25. (New) A method of detecting strain in a structure comprising mounting an assembly of claim 1, 5 or 6 on said structure

a substantially square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first axis defined by a first pair of diagonally opposed ones of said holes;

a second axis defined by a second pair of diagonally opposed ones of said holes;

a strain gauge secured to said plate, said strain gauge comprising four uniaxial strain elements in a square patter on said strain gauge, a first pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said first axis and a second pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said second axis;

a plurality of standoffs mounted on said plate, said standoffs not lying on either said first or second axes;

a printed circuit board mounted on said standoffs and overlaying said strain gauge;

said printed circuit board containing traces defining a Wheatstone full bridge configuration including said four elements of said strain gauge, and lead-throughs for establishing electrical connection between said traces and a plurality of leads emanating from said strain gauge;

said leads extending from said strain gauge through said lead-throughs;

said plate having substantially straight sides; and,

a cover mounted on said plate to cover said standoffs, printed circuit board and strain gauge, said cover being oriented such that its corners lie along lines bisecting the straight sides of said plate;

said assembly being mounted by inserting fastening elements through said holes such that said first axis lies along a principal strain axis along which strain is to be measured.

26. (New) A method of sensing the load in a container, said container having a structural element that is subject to a strain along a principal strain axis when the container is loaded comprising mounting a load sensor assembly on said structural element, said assembly comprising:

a substantially square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first axis defined by a first pair of diagonally opposed ones of said holes;

a second axis defined by a second pair of diagonally opposed ones of said holes;

a strain gauge secured to said plate;
said assembly being mounted on said structural element by inserting fastening elements through said holes such that said first axis lies along said principal strain axis.

27. (New) A method of sensing the load in a container, said container having a structural element that is subject to a strain along a principal strain axis when the container is loaded comprising mounting a load sensor assembly on said structural element, said assembly comprising:

a substantially square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first axis defined by a first pair of diagonally opposed ones of said holes;

a second axis defined by a second pair of diagonally opposed ones of said holes;

a strain gauge secured to said plate, said strain gauge comprising four uniaxial strain elements in a square patter on said strain gauge, a first pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said first axis and a second pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said second axis;

said assembly being mounted on said structural element by inserting fastening elements through said holes such that said first axis lies along said principal strain axis.

28. (New) A method of sensing the load in a container, said container having a structural element that is subject to a strain along a principal strain axis when the container is loaded comprising mounting a load sensor assembly on said structural element, said assembly comprising:

a substantially square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first axis defined by a first pair of diagonally opposed ones of said holes;

a second axis defined by a second pair of diagonally opposed ones of said holes;

a strain gauge secured to said plate, said strain gauge comprising four uniaxial strain elements in a square patter on said strain gauge, a first pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said first axis and a second pair of diagonally opposed ones of said elements having axes of sensitivity oriented parallel to said second axis;

a plurality of standoffs mounted on said plate, said standoffs not lying on either said first or second axes;

a printed circuit board mounted on said standoffs and overlaying said strain gauge;

said printed circuit board containing traces defining a Wheatstone full bridge configuration including said four elements of said strain gauge, and lead-throughs for establishing electrical connection between said traces and a plurality of leads emanating from said strain gauge;

said leads extending from said strain gauge through said lead-throughs;

said plate having substantially straight sides; and,

a cover mounted on said plate to cover said standoffs, printed circuit board and strain gauge, said cover being oriented such that its corners lie along lines bisecting the straight sides of said plate;

said assembly being mounted on said structural element by inserting fastening elements through said holes such that said first axis lies along said principal strain axis.

29. (New) A method of detecting strain in a structure comprising mounting a load sensor assembly on said structure, said assembly comprising:

a square plate;

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a hole in each of four corners of said plate for receiving a fastener therethrough;

a first uniaxial strain gauge secured to said plate along a first axis defined between a first pair of diagonally opposing ones of said holes;

a second uniaxial strain gauge secured to said plate along a second axis defined by a second pair of diagonally opposed ones of said holes;

said assembly being mounted on said structure by inserting fastening elements through said holes such that said first axis lies along a principal strain axis along which strain is to be measured.

30. (New) A method of detecting strain in a structure comprising mounting a load sensor assembly on said structure, said assembly comprising:

a square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first uniaxial strain gauge secured to said plate along a first axis defined between a first pair of diagonally opposing ones of said holes;

a second uniaxial strain gauge secured to said plate along a second axis defined by a second pair of diagonally opposed ones of said holes;

a plurality of standoffs mounted on said plate, said standoffs not lying on either said first or second axes;

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a printed circuit board mounted on said standoffs and directly overlaying said first and second strain gauges;

said printed circuit board containing traces defining a Wheatstone full bridge configuration including said first and second strain gauges, and lead-throughs for establishing electrical connection between said traces and a plurality of leads emanating from said first and second strain gauges;

said leads extending from said first and second strain gauges through said lead-throughs; and,

a cover mounted on said plate to cover said standoffs, printed circuit board and strain gauges, said cover being oriented such that its corners lie along lines bisecting the straight sides of said plate;

said assembly being mounted on said structure by inserting fastening elements through said holes such that said first axis lies along a principal strain axis along which strain is to be measured.

31. (New) A method of detecting strain in a structure comprising mounting a load sensor assembly on said structure, said assembly comprising:

a square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first uniaxial strain gauge secured to said plate along a first axis defined between a first pair of diagonally opposing ones of said holes;

a second uniaxial strain gauge secured to said plate along a second axis defined by a second pair of diagonally opposed ones of said holes;

a plurality of standoffs mounted on said plate, said standoffs not lying on either said first or second axes;

a printed circuit board mounted on said standoffs and directly overlaying said first and second strain gauges;

said printed circuit board containing traces defining a Wheatstone full bridge configuration including said first and second strain gauges, and lead-throughs for establishing electrical connection between said traces and a plurality of leads emanating from said first and second strain gauges;

said leads extending from said first and second strain gauges through said lead-throughs; and,

a cover mounted on said plate to cover said standoffs, printed circuit board and strain gauges, said cover having a square cross section and being oriented such that its corners lie along lines bisecting the straight sides of said plate and such that each of its sides is perpendicular to either said first or second axis;

said assembly being mounted on said structure by inserting fastening elements through said holes such that said first axis lies along a principal strain axis along which strain is to be measured.

32. (New) A method of sensing the load in a container, said container having a structural element that is subject to a strain along a principal strain axis when the container is loaded comprising mounting a load sensor assembly on said structural element, said load sensor assembly comprising:

a square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first uniaxial strain gauge secured to said plate along a first axis defined between a first pair of diagonally opposing ones of said holes;

a second uniaxial strain gauge secured to said plate along a second axis defined by a second pair of diagonally opposed ones of said holes;

said assembly being mounted on said structure by inserting fastening elements through said holes such that said first axis lies along said principal strain axis.

33. (New) A method of sensing the load in a container, said container having a structural element that is subject to a strain along a principal strain axis when the container is loaded comprising mounting a load sensor assembly on said structure, said assembly comprising:

a square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first uniaxial strain gauge secured to said plate along a first axis defined between a first pair of diagonally opposing ones of said holes;

a second uniaxial strain gauge secured to said plate along a second axis defined by a second pair of diagonally opposed ones of said holes;

a plurality of standoffs mounted on said plate, said standoffs not lying on either said first or second axes;

a printed circuit board mounted on said standoffs and directly overlaying said first and second strain gauges;

said printed circuit board containing traces defining a Wheatstone full bridge configuration including said first and second strain gauges, and lead-throughs for establishing electrical connection between said traces and a plurality of leads emanating from said first and second strain gauges;

said leads extending from said first and second strain gauges through said lead-throughs; and,

a cover mounted on said plate to cover said standoffs, printed circuit board and strain gauges, said cover being oriented such that its corners lie along lines bisecting the straight sides of said plate;

said assembly being mounted on said structure by inserting fastening elements through said holes such that said first axis lies along said principal strain axis.

34. (New) A method of sensing the load in a container, said container having a structural element that is subject to a strain along a principal strain axis when the container is loaded comprising mounting a load sensor assembly on said structure, said assembly comprising:

a square plate;

a hole in each of four corners of said plate for receiving a fastener therethrough;

a first uniaxial strain gauge secured to said plate along a first axis defined between a first pair of diagonally opposing ones of said holes;

a second uniaxial strain gauge secured to said plate along a second axis defined by a second pair of diagonally opposed ones of said holes;

a plurality of standoffs mounted on said plate, said standoffs not lying on either said first or second axes;

a printed circuit board mounted on said standoffs and directly overlaying said first and second strain gauges;

said printed circuit board containing traces defining a Wheatstone full bridge configuration including said first and second strain gauges, and lead-throughs for establishing electrical connection between said traces and a plurality of leads emanating from said first and second strain gauges;

said leads extending from said first and second strain gauges through said lead-throughs; and,

a cover mounted on said plate to cover said standoffs, printed circuit board and strain gauges, said cover having a square cross section and being oriented such that its corners lie along lines bisecting the straight sides of said plate and such that each of its sides is perpendicular to either said first or second axis;

said assembly being mounted on said structure by inserting fastening elements through said holes such that said first axis lies along a principal strain axis along which strain is to be measured.